REMARKS

Claims 21-44 and 63 will be pending in the application after entry of the forgoing amendment.

The Examiner rejected claims 21-27, 29, 32-33, 38-39, 40-41, 44, and 61-62 under 35 U.S.C. §103 as allegedly being unpatentable over U.S. Patent 7,029,199 to Mayfield in view of U.S. Patent Application Publication 2004/0027414 to Boleda; rejected claims 28, 30-31, 34-36, 63 under §103 as allegedly being unpatentable over Mayfield in view of Boleda, and further in view of U.S. Patent Application Publication 2002/0158955 to Hess; rejected claim 42-43 under §103 as allegedly being unpatentable over Mayfield in view of Boleda, and further in view of U.S. Patent 3,553,371 to Suenaga; and provisionally rejected claims 21-27, 29, 32-33, 38-39, 40-41, 44, 61-62, on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 17, 21-22 of copending U.S. Application 11/813,009 in view of Mayfield and Boleda.

Applicant hereby submits an English language translation of his priority application DE 102-02-553.3 filed January 24, 2002, this date being before the effective date of Boleda. Also submitted is a translator's statement. The undersigned received this translator's statement as an attachment in the same email message attaching the translation.

Support for "a first step" in claim 21, may be found, for example, in the accompanying priority document translation at Figure 1 and the text:

> ... in a first step the properties of the object face are recorded (paragraph [0007]).

Support for "positioning a stationary component" in claim 21, may be found, for example, in the accompanying priority document translation at Figure 1, Fig. 5, Fig. 7, Fig. 8 and the text:

> All embodiments of the first measurement system contain satellites as subcomponents, which are positioned at defined points by an operator at the beginning of the working procedure. (paragraph [0029])... So the afore mentioned first measurement system.... contains one or more satellites, which

are located in a fixed positoin in relation to the object face. (paragraph [0031]) ... As an example PSDs (position sensitive devices), which act as satellites, are mounted at at least two fix positions and which acquire the object face or parts thereof. (paragraph [0044])

Support for "receiving first data corresponding to geometric properties of features of an external surface of a building or civil engineering work" in claim 21, may be found, for example, in the accompanying priority document translation at Figure 1 and the text:

> First recording of the object faces and of the positions of perturbation of the object face like doors, windows, protrusions, balconies, window sills, deposits eaves, arresters, switches, lamps and other features is performed with the help of a measurement system, which works according to functional princples which are also used within the navigation system of the paint application device. In this first step also the color properties of the base layer may be recorded electronically with the purpose of color adjustment in a later step. (paragraph [0009]) ... Image recording of the object face can be done by cameras contained in satellites of the first measurement system. The geometry of the object face may be preferable recorded from an image taken from at least one satellite containing at least one camera, which is sensitive in the visible or infrared range. (paragraph [0032])...Further the object face may be recorded by scanning a laser beam emitted from at least one satellite over the object face in a line-by-line and/or column-by-column pattern with a defined time schedule. (paragraph [0033])... As an example PSDs (position sensitive devices), which act as satellites, are mounted at at least two fix positions and which acquire the object face or parts thereof. (paragraph [0044])

Support for "generating second data, the second data depending on the first data corresponding to the geometric properties of the features of the external surface and depending on data corresponding to the design" in claim 21, may be found, for example, in the accompanying priority document translation at Figure 1 and the text:

> In a second step the recorded properties of the object face and the image template are digitally processed and assigned to each other. (paragraph

[0007])... The digital data representing the composition of the object face ("first data") and the image template ("design") are digitally processed and assigend to each other in the way, that a virtual surface object ("second data") is derived from the recorded geometrical properties and every point of the virtual surface object is associated to a point of the real surface, that further the digital design template is implemented into the virtual surface object and edited if necessary and, that finally the color value for every point of the virtual surface object is stored. (paragraph [0016])

Support for "a second step, the second step being performed after completion of the first step" in claim 21, may be found, for example, in the accompanying priority document translation at Figure 1 (the block "Paint Application using Paint Application Device") and the text:

> In a third step the position-dependent application of the image onto the object faces is performed by use of the paint application device according to the invention. (paragraph [0007])

Support for "moving the application device on the surface" in claim 21, may be found, for example, in the accompanying priority document translation at Figure 15 and Figure 16 and the text:

> ... the movable paint application device is moved over the object face (paragraph [0017]) ... When moving the paint application device on the object face it has to be secured, that the distance and direction of the paint application elements relative to the object face is maintained within a defined tolerance, which is determined by the properties of the paint application elements and of the paint application control. There are numerous technical solutions out of the state of the art like wheels, spheres, rolls, especially paint rolls, or gliding elements, which can secure to move the device linear, parallel and with a constant distance on the object face. (paragraph [0064])

Support for "measuring a position of a non-stationary component relative to the stationary component, the non-stationary component being attached to the application device" in claim 21, may be found, for example, in the accompanying priority document

translation at Figure 5 and Figure 6 and Figure 8 and the text:

> When the movable paint application device is moved over the object face, the position measurement system continuously supplies the actual position of the paint application device. (paragraph [0017]) ... The systems herein referred to as first measurement system measure the position of movable components ("non-stationary components") in relation to fixed landmarks, herein called satellites ("stationary components"), also as part as of the first measurement system. The movable parts of the first measurement system can be included into the paint application device. (paragraph [0021])

Support for "controlling the paint application elements by selecting a portion of the second data, the portion selected being determined by the measuring step, to apply paint on the external surface, wherein paint is not applied at positions that have already been fully painted in accordance with the second data...." in claim 21, may be found, for example, in the accompanying priority document translation at Figure 10 and the text:

> The control unit then fetches the color values from the surface object which is stored in the system memory as assigned to the position-coordinates ("second data"), and sends in real time commands for color application to the individual paint nozzles. (paragraph [0017]) ... Once a virtual color pixel has been fully applied onto the object face the pixel is, for example, assigned the attribute "done", switched passive or the color value is pasted by a value, which does not result in a color application. By this an unintended multiple color application at a single point can be avoided. (paragraph [0017])

Support for "measuring a position includes using a measuring method based on linear propagation of light or sound between the non-stationary component and the stationary component." in claim 22, may be found, for example, in the accompanying priority document translation at Figures 5, 6, 8 and the text:

> According to claim 3 the measurement method is based on a contactless measurement of distance or angles. This can be performed with the help of light, infrared, electromagnetic waves or ultrasound. (paragraph [0042]) ... As an example PSDs (position sensitive devices), which act as satellites

("stationary component"), are mounted at at least two fix positions and which acquire the object face or parts thereof. With the help of a PSD being equipped with a lens the direction of the focal point of incident light can be measured with extreme accuracy in the 2D or 3D domain. A LED as a light source on a movable position measurement unit ("non-stationary component"), can be localized by said PSDs. (paragraph [0044])

Support for "measuring based on angles or wave propagation time between the nonstationary component and the stationary component." in claim 23, may be found, for example, in the accompanying priority document translation at Figures 5, 6, 8 and the text:

Satellites ("stationary component") as well as position measurement units ("non-stationary component") may work as a transmitter and/or a receiver. Elapsed time and/or angles are measured in this case between the systems. (paragraph [0043])

Support for "measuring a position includes using a camera or a laser-source or a reflecting or absorbing landmarks or a visual feature or position sensitive device (PSD)." in claim 24, may be found, for example, in the accompanying priority document translation at Figures 5, 6, 7, 8 and the text:

Camera, PSD: The at least two satellites may contain at least one PSD or one camera. (paragraph [0032]) ... *Light Source*: A LED as a light source on a movable position measurement unit, can be localized by said PSDs. (paragraph [0044])... *Laser source:* Besides the angular measurement methods the light- and laser-based distance measurement methods shall be mentioned, which are based on the measurement of elapsed time or inference.(paragraph [0046])... *Reflecting and absorbing landmarks:* Small (modulated or multiplexed) light- or heat sources as well as special reflectors or absorbers may serve as landmarks. (paragraph [0048])... Visual feature: Recording the surface optically by photoelectric transducers (scanner,cameras etc.), which are directed towards the object face and a subsequent feature extraction can also provide position information. The recorded image can contain features of the already applied image, a reference pattern or constructional features like borders.

(paragraph [0057])

Support for "measuring a position includes measuring according to an Inside-Out method, or, according to an Outside-In method." in claim 25, may be found, for example, in the accompanying priority document translation at Figures 5, 6, 8 and the text:

> Satellites ("stationary component") as well as position measurement units ("non-stationary component") may work as a transmitter and/or a reciever. Elapsed time and/or angles are measured in this case between the systems. (paragraph [0043]) ... *Inside-Out Example*: Recording the surface optically by photoelectric transducers (scanner,cameras etc.), which are directed towards the object face and a subsequent feature extraction can also provide position information. (paragraph [0057])... *Outside-In Example*: The position or colour information may be generated within a satellite: (paragraph [0030])... The at least two satellites may contain at least one PSD or one camera. (paragraph [0032])

Support for "measuring a movement of the application device by measuring a linear or rotational velocity, or a linear or rotational acceleration , wherein the portion of the second data selected is also determined by the step of measuring movement." in claim 26, may be found, for example, in the accompanying priority document translation at Figures 2, 11, 12, 13, 14 and the text:

> The systems herein referred to as second measurement system measure the movement of the paint application device for example by sensors, which are included in the paint application device and which do not utilize fixed landmarks. These are for example linear and rotational acceleration sensors, rotational rate sensors, velocity sensors, magnetometers, inclinometers, and imaging sensors, which inspect a small area of the object face, from which the motion is calculated for example by correlation methods. (paragraph [0022])

Support for "recording an image of a portion of the external surface by using a scanner or camera attached to the application unit; and extracting position relevant features from the recorded image, the features including visual features of previously applied paint or a reference pattern or structural features." in claim 27, may be found, for example, in the accompanying priority document translation at Figure 7 and the text:

Recording the surface optically by photoelectric transducers (scanner,cameras etc.), which are directed towards the object face and a subsequent feature extraction can also provide position information. The recorded image can contain features of the already applied image, a reference pattern or constructional features like borders. (paragraph [0057])

Support for "measuring a movement of the application device, and using a result of the step of measuring a movement when due to disturbed intervisibility between the non-stationary component and the stationary component, the step of measuring a position is unable to provide valid position data. " in claim 28, may be found, for example, in the accompanying priority document translation at Figure 10 and the text:

... For this intervisiblity has to be possile between the relevant components of the first measurements system. If not, the operator has to be informed, either by a negative message or by not providing a positive message, and the operator is instructed to move the paint application device over the surface, until the first measurement system supplies a valid position. This position is used by the paint application control and to initialize the second measurement system. Initializing can simply mean to reset the initial conditions of the motion sensors. Now follows the computation of the position based on the available measurement data as provided from the first and the second measurement system. In this case, right after an initialization, the position calculated is identical to the position provided from the first measurement system. (paragraph [0025]) ... A position may by invalid, if intervisibility is disturbed, as already explained above, or if the measurement rate of the first measurement system is lower than the actual cycle speed of system. (paragraph [0025])

Support for "if within a region of the external surface the step of measuring a position is unable to provide valid position data due to disturbed intervisibility, paint in this region is applied by moving the application device from a point of valid position into that region, whereby the position of the paint

application elements is determined by a step of measuring movement." in claim 29, may be found, for example, in the accompanying priority document translation at Figure 10 and

the text:

> Based on the messages the operator is able to recognize regions, where intervisibility issues within the first measurement system occur. If he has identified an aforesaid region, he is advised to bring the paint application device into contact with the object face at a point of known position and to move the device into the said region shortest or quickest path. (paragraph [0026])

Support for "messages are generated for an operator, the messages indicating, if the step of measuring a position has available a valid position or not" in claim 30, may be found, for example, in the accompanying priority document translation at Figure 10 and the text:

> When the color application is started by a command from the operator, it is checked first if position informations are available from the first measurement system. For this intervisiblity has to be possile between the relevant components of the first measurements system. If not, the operator has to be informed, either by a negative message or by not providing a positive message, and the operator is instructed to move the paint application device over the surface, until the first measurement system supplies a valid position. (paragraph [25])... Based on the messages the operator is able to recognize regions, where intervisibility issues within the first measurement system occur. (paragraph [0026])

Support for "paint application is suppressed, if the position could not be evaluated sufficiently exact." in claim 31, may be found, for example, in the accompanying priority document translation at Figure 10 and the text:

> If the position error exceeds an accepatance threshhold, the color application is stopped ... (paragraph [0025]) ... In both cases the position error is evaluated and checked before issuing the paint application command. It is obvious, that when moving the paint application device far into an area, where intervisibility fails, the position error increases from cycle to cycle and finally the paint application is stopped automatically. (paragraph [0025])

Support for "the application device is moved manually, by an autonomous robot or

by cable." in claim 32, may be found, for example, in the accompanying priority document translation at Figure 5, 6, 8, 9, 11, 12, 13, 14, 16 and the text:

> *Manual:* The device comprizes a handle and a person moves the device by pressing it against the object face. (paragraph [0066]) ... R*obotic*: At last, as in claim 14, a fully automatic operation is possible. By this the motion of the paint application device is determined in a fully automatic way without the help of an operator. In this case the paint application device is kept and moved in an optimal distance and angle relative to the object face by using suitable devices, whereby the route is determined based on the already painted regions.paragraph [0069])... *Cable:* To support and move the device for example on facades of tower blocks, devices similar to the known service platforms are suited, for example comprizing a pulley, which is movable on a rail attached to the upper border of the facede and a cable, which is attached to the paint applicatin device. (paragraph [0065])

Support for "the application device is maintained in contact with the external surface by use of a rolling or sliding element." in claim 33, may be found, for example, in the accompanying priority document translation at Figures 11, 12, 13, 14, 18 and the text:

> When moving the paint application device on the object face it has to be secured, that the distance and direction of the paint application elements relative to the object face is maintained within a defined tolerance, which is determined by the properties of the paint application elements and of the paint application control. There are numerous technical solutions out of the state of the art like wheels, spheres, rolls, especially paint rolls, or gliding elements, which can secure to move the device linear, parallel and with a constant distance on the object face. (paragraph [0064])

Support for "application of paint beside a region containing previously applied wet paint is performed by moving the application device alongside the region such that a number of paint application elements laterally protrude over the rolling or sliding element and overlap this region" in claim 34, may be found, for example, in the accompanying priority document translation in the text:

> In case of using slowly drying paints it is advantagous, if the paint application elements laterally protrude from the means to drive on the object face. Additionally an electronic or computer assisted control of the distance and the orientation of the paint application elements relative to the object face is possible, for example by using sensors to measure the distance at different points or by servo motors, which can control the position or inclination of the paint application head. (paragraph [0064]) ... It is advantagous, that the array of paint application elements laterally extends the contours of the paint application device. By this it can be worked easily in concave corners or slowly drying paint can be used, because the paint application elements laterally exceed also the position of the wheels by a measure, called overlap. Thus, when in a new step paint is applied beside a previously painted, still wet reagion, smearing is avoided. (paragraph [0071])... During paint application the operator has to take care that the boundary of a previously painted region 47 is always within the overlap between the paint application head and the paint roll of the paint application device. (paragraph [0094])

Support for "the paint application elements employ methods of compressed air spraying, air mix spraying, supercritical spraying, hot spraying or drop on demand methods." in claim 35, may be found, for example, in the accompanying priority document translation at Figure 3, 4 and the text:

> There are multiple technological possibilities to realize paint nozzle arrays. The contained single paint nozzles can work according to different methods known from the state of the art. For example a compressed air spraying method, an airless-spraying method, a mixed air spraying method, the supercritical spraying method or the hot-melt method shall be mentioned. (paragraph [0072]) ... Also Drop-On-Demand methods, where single droplets are produced and projected onto a surface, may be suited for use in the paint application device. (paragraph [0073])

Support for "different coating materials are applied by the application device in parallel, the coating materials including a ground coat, a conversion coat or a fixing coat."

in claim 36, may be found, for example, in the accompanying priority document translation at Figure 16 and the text:

> In a variant further layers may be applied additional to the color layer within one operation, for example a priming layer, which binds the color chemically. For this, paint application elements of the array may be used or further elements may be arranged in movement direction before or behind the paint nozzles. These may be designed equal to or different to the paint nozzles. (paragraph [0075]) ... Fig. 4 shows a paint application head 24 with additional paint application elements 23 to apply a primary layer or a cover layer. An optional UV-lamp 25 may serve for curing an applied paint layer. (paragraph [0082])

Support for "wherein controlling the paint application elements includes taking into account that, due to the movement of the paint application device, the position of a paint application element is located in movement direction by the amount of a position offset ahead a measured real time position of the paint application element." in claim 37, may be found, for example, in the accompanying priority document translation at Figure 10 and the text:

> The described cycle is running so fast, that the paint application device has already moved due to the velocity of the motion. So a position error is produced due to said motion and furthermore by the fact, that every paint application head induces a definite time delay when transporting the paint onto the surface. As a consequence the resulting position error has to be corrected for example by implementing position offsets. Practically this means, that those color values of the color – position assignment are forwarded to the color application head for paint application, which according to the color – position assignment are located ahead of the actual realtime position. The position offset generally is a function of the velocity and the acceleration. (paragraph [0025])

Support for "wherein the first data is generated using the stationary component" in claim 38, may be found, for example, in the accompanying priority document translation at Figures 6, 8 and the text:

> All embodiments of the first measurement system contain satellites ("stationary

components") as subcomponents, which are positioned at defined points by an operator at the beginning of the working procedure. This measurement system is further suited to form a reference coordinate system. ... This measurement system can be used to record the properties of the object face as well as to measure the position of the paint application device. (paragraph [0029])

Support for "The method of claim 21 wherein measuring a position of a non-stationary component relative to the stationary component further includes measuring a position of the non-stationary component relative to a plurality of stationary components." in claim 39, may be found, for example, in the accompanying priority document translation at Figure 5 and the text:

> All embodiments of the first measurement system contain satellites as subcomponents, which are positioned at defined points by an operator at the beginning of the working procedure. ... But by using a large number of satellites a high coverage of the object face is achievable. (paragraph [0029]) ... At fix positions of the object face 12 satellites of the first measurement system are attached by fixation means 19, each comprizing an optical lens 15 and the measurement element, a PSD 14. (paragraph [0083])

Support for "generating the first data by measuring a physical characteristic of the external surface." in claim 40, may be found, for example, in the accompanying priority document translation at Figure 6, 8 and the text:

> First recording of the object faces and of the positions of perturbation of the object face like doors, windows, protrusions, balconies, window sills, deposits eaves, arresters, switches, lamps and other features is performed with the help of a measurement system, which works according to functional princples which are also used within the navigation system of the paint application device. In this first step also the color properties of the base layer may be recorded electronically with the purpose of color adjustment in a later step. Also the quality of the base layer may be evaluated and may be improved by adding layers like finery or a ground layer. (paragraph [0009]) ... This measurement system can be used to record the properties of the object face as well as to

measure the position of the paint application device. (paragraph [0026])

Support for "wherein generating the second data includes compensating for features on the external surface." in claim 41, may be found, for example, in the accompanying priority document translation in the text:

> Optional, in case of an imaging-based recording of the object face, the information recorded can be included in the step of image processing. So, for example spots on the object face or regions with different ground color may be additionally recorded. In these cases the recorded picture of the surface face can be included in the image processing, either to compensate spots or to amplify volitional features color. Spot compensation can, for example, be done by adding the inverted recorded image containing the spots to the digital template to receive a corrected image. (paragraph [0015])

Support for "generating the first data by measuring a color of the external surface." in claim 42, may be found, for example, in the accompanying priority document translation in the text:

> Optional, in case of an imaging-based recording of the object face, the information recorded can be included in the step of image processing. So, for example spots on the object face or regions with different ground color may be additionally recorded. In these cases the recorded picture of the surface face can be included in the image processing, either to compensate spots or to amplify volitional features color. Spot compensation can, for example, be done by adding the inverted recorded image containing the spots to the digital template to receive a corrected image. (paragraph [0015])

Support for "generating the second data includes generating the second data to compensate for colors on the external surface." in claim 43, may be found, for example, in the accompanying priority document translation in the text:

> With respect to the object face digital edition is understood as the reported data representing the color properties of the object face are additionally accounted to calculate the color values of the points within the virtual surface object. The color value of the points of the virtual surface object is defined, by substracting

at every point the color value of the modified or unchanged color value of the real object face from the nun-edited and edited color-value of the digital design template, yielding in a compensation of blotches. (paragraph [0016])

Support for "positioning a stationary component comprises positioning the stationary component in a way allowing the position of the non-stationary component to be measured relative to the stationary component within only a subportion of the external surface." in claim 44, may be found, for example, in the accompanying priority document translation at Figure 10 and the text:

> All embodiments of the first measurement system contain satellites as subcomponents, which are positioned at defined points by an operator at the beginning of the working procedure. This measurement system is further suited to form a reference coordinate system. Intervisibility is postulated between the satellites and the measurement point, which is not given in all cases. But by using a large number of satellites a high coverage of the object face is achievable. (paragraph [0029])

Support for "generating a message advising an operator; responsive to the message, bringing the application device into contact with the external surface at a point of known position; and moving the application device into the region of the external surface within which the step of measuring a position is unable to provide valid position data due to disturbed intervisibility." in claim 63, may be found, for example, in the accompanying priority document translation at Figure 10 and the text:

> Based on the messages the operator is able to recognize regions, where intervisibility issues within the first measurement system occur. If he has identified an aforesaid region, he is advised to bring the paint application device into contact with the object face at a point of known position and to move the device into the said region shortest or quickest path. In case of a very large reagion, when also repeated action does not result in a paint application, the opertator is advised to mount additional landmarks of the first measurement system. (paragraph [0026]).

Thus, Boleda not being a reference for any of the pending claims, the pending claims are nonobvious in view of the art of record, for that reason alone.

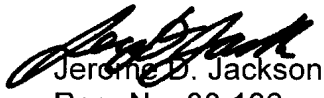
Furthermore, even if Boleda were a reference, the pending claims would still be nonobvious because base claim 21 recites, inter alia, "measuring a position . . . ; and controlling the paint application elements by selecting a portion of the second data, the portion selected being determined by the measuring step." Mayfield discloses that "the computer reads the next point from the map file and sets it to be the current point for processing. At step 40 the computer reads carriage position data from base station 6. At step 44 the computer compares the data read at step 38 with the data read at step 40. . . . control passes back to step 38 and the previous procedure is repeated until all the points of the map file have been processed." Mayfield col. 5, lines 7-34. Thus, although Mayfield is responsive to position data, he does not use his position data to select a point from his map file.[1] Thus, Mayfield can neither disclose nor suggest this "selecting" step recited in base claim 21.

Furthermore, it is not obvious how such a "selecting" step could be imported into Mayfield's existing carriage control features, outlined in Mayfield's Fig. 4.

1. In this regard, the Examiner stated that the Mayfield "paint application elements are commanded to apply paint on the external surface based upon the second data and the position of the application device [col 5, In 7-15, 26]." (Office Action, page 3). Although this statement by the Examiner may be true, it does not address the issue of how Mayfield selects his map data.

If the Examiner has any questions, Applicant's representative can be reached at 703-684-4840.

Respectfully submitted,



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